

Questionnaire Design

ECO 230: Business Research and Communication

Goals and Learning Objectives

- Goals of this chapter:
 - Be aware of potential sources for bias in survey research
 - Identify survey questions & variables needed to answer a research question.
 - Identify pros and cons of open ended and fixed-alternative questions.
 - Be able to phrase questions to limit respondent bias.
 - Be able to order questions to limit respondent bias.
- Learning objectives:
 - LO2: Recognize and use the appropriate techniques to collect or use survey data to address a research problem.
 - LO2.C: Identify sources of respondent and administrative error and develop the ability to construct and administer a survey instrument that minimizes these errors.

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Basic Principles

- 1 Criteria for good measurement
- 2 Strategies to avoid bias
- 3 Types of questions
- 4 Phrasing of questions
- 5 Sequencing of questions

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Criteria for Good Measurement

- **Reliability:** Measurement can be reproduced with repetition
- **Validity:** On average, measurement corresponds to true attitudes, behaviors, or quantities
- **Sensitivity:** Measurement is able to identify small differences between responses
 - Measurement with sensitivity has a lot of options or large scale.

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Example 1

Survey question to **high school students** similar to that asked by La Crosse County Health Department:

How many times in the last month did you engage in binge drinking (five or more drinks in one sitting)?

- What criteria may be lacking?
- What criteria may be strong?

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- What criteria may be lacking?
Validity: On average, students may under-report this behavior
- What criteria may be strong?
Sensitivity: Can identify differences between 0 times, 1 time, 2 times, etc.

Example 2

Popular marketing survey question on age:

What is your age?

- 18-24
 - 25-39
 - 40-54
 - 55+
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- What criteria may be lacking?

 - What criteria may be strong?

Example 2

Popular marketing survey question on age:

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Reliability: Unless people kept records, they cannot be accurate to the dollar
Validity: People commonly underestimate past behavior
- What criteria may be strong?
Sensitivity: Can identify small differences in responses, you just don't believe them

Trade-offs in Good Measurement

- A measure may be *reliable, but not valid*
- A measure may be *valid, but not reliable*
- Trade-off between reliability and sensitivity:
 - Grocery shopping spending: Offer categories of responses

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Random Sampling

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Simple random sample: when all members of the population have an equal probability of being selected for the sample.

- Selection of one observation is independent of another being selected (no point-of-contact, cluster sampling, etc).
- This *does not* mean taking a representative sample - though you should still expect your example to be representative of the population.
- Most important: selection is independent from the outcome/dependent variable.

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Unbiased versus Biased Estimators

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- **Unbiased estimator:** when a sample estimate (statistic) of a population parameter on average returns the true population parameter.
- **Bias:** when a sample estimate on average returns a value different than the population parameter.
- **Random sampling error:** statistical fluctuations determined by chance due to random sampling.
 - Unbiased error.
 - Easy to estimate the size of the sampling error (you used this estimate for H-tests, confidence intervals).

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- It is typically impossible to measure systematic error.
- Systematic error causes **sample bias**, the persistent tendency of the results to be biased due to a problem in the sampling procedure.

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Nonresponse Error

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- **Nonresponse error:** systematic error that occurs when individuals surveyed choose not to participate in the research, *and the choice to not participate may be related to the outcome variable.*
- **Self-selection bias:** bias that results from nonresponse error.
- Examples:
 - Viterbo awareness survey: individuals less knowledgeable and/or less interested in Viterbo University were less likely to respond to the survey.
 - Customer satisfaction survey: individuals who are satisfied, but by no means excited, about product or service are less likely to respond to a customer satisfaction survey.

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Response Bias

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- **Response bias:** a bias that exists when respondents either consciously or unconsciously give answers to questions that misrepresent the truth.
- Appear intelligent: respondents deliberately falsify the answer to hide the fact they don't know or didn't keep track of this information.
 - Respondents might guess what answer is expected from them, give answers that would please the interviewer or researcher.
 - Example: Price paid for grocery items, respondents might guess instead of honestly answering they don't remember.
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- Situation might dictate response. Example: preference for aircraft given on the plane.
- Unexpected question: respondents have thought little about the question, give best initial answer they can.
- Example: intentions of buying a product, consumers may not accurately predict their own future buying behavior.
- Time lapse: respondents may under-report activities that occurred long ago which are difficult to remember in detail.

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Types of Response Bias

- **Acquiescence bias:** when respondents tend to agree or disagree with every statement.
 - Can happen with surveys concerning new products.
- **Extremity bias:** when respondents choose to use extreme responses on a scale; some respondents have the opposite problem and almost always refuse to pick extreme responses.
- **Social desirability bias:** either consciously or unconsciously, respondents give answers to appear prestigious, socially conscious or avoid appearing socially unattractive.
 - Did you vote in the last election?
 - Do you have termites in your home?
 - Questions regarding sensitive issues, such as sexual activity.

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Structuring Surveys to Limit Error

- Structured questions: give respondents a limited categories to choose answer from.
 - Might not be necessary for age, unless you feel respondents are sensitive about this.
 - Might help with details that are difficult to remember, such as number of hours spent studying, price paid for a product.
 - Allow a “I don't remember” or similar response.
- Disguised questions: questions do not reveal purpose of the research project, which might cause extremity bias, acquiescence bias, or nonresponse bias.
 - Example: Satisfaction with Economics Ph.D. program.
 - Ask several different types of questions.
- Avoid questions concerning subconscious behavior.

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What should be asked?

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- Get data on relevant outcome variables.
- Get data on background variables and other explanatory variables.
- Example: Living on campus and academic performance
 - Outcome variables: semester GPA, cumulative GPA, frequency using campus resources, extra curricular activities.
 - Relevant explanatory variables: high school GPA, parents' income, year in school.
- Be careful not to ask too many questions! This can decrease response rate.

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Open-ended Questions

- **Open-ended questions** can serve uses that fixed alternative questions cannot:
 - How can service be improved?
 - Viterbo might want to ask: What Viterbo community events are you aware of?
- Can get deeper answers, reasoning behind answers.
- Useful for exploratory research, though not exclusively.
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- Greater chance for respondent biases.
 - *Average person effect*: individual may not want to give a response he or she may expect is unusual.
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Fixed Alternative Questions

- **Fixed-alternative questions:** questions where the interviewer provides only a limited number of answers to choose from.
- Simple dichotomous questions: respondent must pick one and only one of two possible alternatives.
 - Have you attended any UW-L varsity athletic sporting events in the last year? Yes No
- Determinant-choice questions: respondent chooses one and only one choice from 3 or more options.
- What is your current academic status?
 - Freshman (undergraduate degree seeking / less than 30 credits accumulated)
 - Sophomore (undergraduate degree seeking / 30 or more credits and less than 60 credits accumulated)
 - Junior (undergraduate degree seeking / 60 or more credits and less than 90 credits accumulated)
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Avoid Problems with Determinant Choice Questions 20/30

- Don't force invalid responses: make sure your choices are **totally exhaustive**.
- Make sure the correct choice is clear:
 - Make sure wording is sufficient and appropriate (notice definitions about college year)
 - Make sure choices are **mutually exclusive**.
- Impossible for respondents to explain, clarify, or qualify an answer:
 - Do you think women should be able to legally get an abortion? Yes / No.

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Frequency Determination Questions

- **Frequency determination questions:** Questions which ask for how often some occurrence generally happens.
- How often do you study for your classes, besides completing homework assignments?
 - One or more times every day.
 - 4-6 times per week
 - 2-3 times per week
 - Once per week
 - One or two times per month.
 - Less than one time per month.
- Look out for:
 - Should you expect frequency to be constant, or does it change by season, semester, etc?
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- **Checklist question:** fixed-alternative question that allows respondent to provide multiple answers to a question.
- Please check which of the following sources of media you use at least twice per week, if any:
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- Write questions that generate accurate answers.
- Questions should have answers that are easy to recall.
- Be careful with questions regarding quantity or frequencies: make sure it is reasonable for respondents to accurately report these.
- Do the following questions have accuracy problems? How would you fix it?
 - How many hours per week do you usually study?
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Ordinal Scales

24 / 30

- **Ordinal scales:** Responses to a question that have a natural order/ranking.
- Common attitude scales:
 - Strongly agree, Agree, Disagree, Strongly disagree.
 - Very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied.
- Common quality scale:
 - Excellent, Very Good, Fair, Poor
- Avoid ambiguous frequency scales:
 - Always, Often, Occasionally, Rarely, Never

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- Avoid **leading questions**: questions that lead the respondent to a particular conclusion.
- Avoid **loaded questions**: questions that suggest a socially desirable answer, or questions or answers that are emotionally charged.
- Examples:
 - Should foreign-born terrorists caught and held in United States detention facilities be given the same legal rights as U.S. citizens?
 - Do you believe it is acceptable for the United States to detain potentially innocent battlefield detainees without legal representation and interrogate them by means that violate the Geneva Convention against torture?
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Avoid Ambiguity

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- How often do you read your local newspaper or popular national newspapers such as the *Wall Street Journal* or the *New York Times*?
 - Frequently Occasionally Hardly Ever Never
 - Where is the line between frequently and occasionally?
 - Does the *New York Post* count as a “popular national newspaper?”
- How many car repairs did you do in the last year?
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- How often do you read your local newspaper or popular national newspapers such as the *Wall Street Journal* or the *New York Times*?
 - Frequently Occasionally Hardly Ever Never
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 - Should General Electric continue to pay its stockholders its outstanding quarterly dividends? Yes/No
 - Implied assumption for the respondent that he/she might not believe.
- Avoid questions that assume the respondents have thought about an issue, or have knowledge of an issue:
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 - Many respondents will answer, even though they have no prior opinion and no prior knowledge of the topic.

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Sequencing Strategies

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- **Funnel technique:** strategy of asking general questions before specific questions in order to limit question-sequence bias.
- **Filter question:** To eliminate bias caused by lack of knowledge or prior opinion, first ask questions that reveal the respondent's background on the topic, then proceed only if there is sufficient background.
 - Do you plan to vote in the upcoming Democratic primary election for the Wisconsin 95th Assembly seat?
 - Are you aware of existing arguments for and/or against changing the name of Wimberly Hall?
- **Sequence to maintain interest:**
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